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## IN THE SPECIFICATION:

Please amend Paragraph [0016] as follows:

[0016] According to another aspect of the invention, there is provided a railroad hopper car discharge gate assembly including a frame having a pair of spaced, generally parallel side frame members and a pair of spaced, generally parallel end frame members fixed between the side frame members to define a ledgeless discharge outlet for the gate assembly. A gate is adapted for sliding endwise movements along a predetermined path of travel between closed and open positions relative to the discharge opening defined by the gate assembly frame. The gate includes upper and lower generally parallel surfaces. In an area surrounding peripheral edges of the gate, the side frame members and the end frame members each have a first leg portion or wall structure and a second apertured leg or flange portion extending in generally normal relation away from the first leg portion or wall structure. The spacing between the first leg portions wall structures of the side frame members and the end frame members being such that the ledgeless discharge outlet for the gate assembly measures about 1740 square inches. The gate assembly frame further includes laterally spaced support members disposed generally parallel to the side frame members and extending between the end frame members in sliding engagement with the lower surface of and for supporting the gate in the closed position against columnar load adapted to be exerted against the upper surface of the gate. The side frame members extend away from the discharge outlet for the gate assembly and are configured to support the gate when the gate is moved to the open position.

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Please amend Paragraph [0017] as follows:

[0017] According to this aspect of the invention, an operating shaft assembly, carried by the side frame members, is provided for rotational movement about a fixed axis. The operating shaft assembly is operably coupled to the gate. Moreover In one form, a lock assembly, operable in timed relation relative to rotation of said the operating shaft assembly, is provided for preventing inadvertent movement of said the gate toward the open position. Notably, the lock assembly is operably removed from the path of movement of the gate prior to the gate being positively moved, under the influence of the operating shaft assembly, toward the open position.

Please amend Paragraph [0018] as follows:

[0018] According to still another aspect of the invention, there is provided a gate assembly adapted to be secured in material receiving relation relative to a standard opening defined toward a bottom of a railroad hopper car. According to this aspect of the invention, the gate assembly includes a rigid frame having a longitudinal axis and including a series of side frame members and end frame members which are spaced relative to each other and configured to provide said frame with a ledgeless and generally rectangular square discharge opening sized substantially equivalent to the standard opening defined toward the bottom of the railroad hopper car whereby allowing commodity discharged from the standard opening at the bottom of the railcar to pass through the gate assembly in a substantially unhindered fashion thereby promoting the discharge of commodity from the railcar. Each side frame member and end frame member defines a series of apertures

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which combine to define a bolting pattern generally corresponding to a standard bolting pattern surrounding the standard opening toward the bottom of the railroad hopper car whereby facilitating securement of the gate assembly to the railroad hopper car. The ledgeless frame further includes a generally centralized support extending generally parallel to the longitudinal axis of the frame with two additional supports disposed to opposed sides of the centralized support. A gate is slidably mounted for endwise movements between open and closed positions relative to the ledgeless opening defined by the frame and along a generally linear path of movement for controlling discharge of commodity through the ledgeless opening. The gate is supported by the supports on the frame when in the closed position and supported by frame extensions when moved to the open position.

Please amend Paragraph [0019] as follows:

[0019] To move the gate between the open and closed positions, an operating shaft assembly is provided for rotation about a fixed axis. The operating shaft assembly has a pair of opposed ends disposed for operator access from opposite sides of the gate assembly frame. A drive mechanism operably couples the operating shaft assembly to the gate. A In accordance with this aspect, a lock assembly, operably connected to the operating shaft, is operable in timed relation relative to movement of the gate toward the open position. According to this aspect of the invention, the lock assembly includes a stop mounted for movement between a first position, wherein the stop is disposed in the path of movement of said gate whereby inhibiting inadvertent movement of the

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gate from the closed position toward the open position, and a second position, wherein the stop is removed from the path of movement of the gate.

Please amend Paragraph [0022] as follows:

[0022] To According to this aspect, and to accomplish sequential operation of the operating shaft assembly, lock assembly and movement of the gate toward the open position, a lost motion mechanism is preferably provided between the operating shaft assembly and the gate. In one form, such lost motion mechanism collapses upon initial rotation of the operating shaft assembly in a direction to move the gate toward the open position whereafter the operating shaft assembly is operably coupled to the gate. In a preferred embodiment, the lost motion mechanism includes a slip socket defined by each of the laterally spaced pinions on the operating shaft assembly.

Please amend Paragraph [0024] as follows:

[0024] In a preferred form, each side frame member and end frame member of the gate assembly frame is provided with a first leg portion or wall structure and a second apertured leg or flange portion extending in general normal relation relative to each other. The end frame members and the side frame members of the gate assembly are preferably configured to add strength and rigidity to the gate assembly frame to withstand the increased loading placed thereon by the significantly increased size of the discharge opening in the gate assembly. That is, each end frame member and each side frame member of the gate assembly further includes a another

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flange or third leg portion joined to and disposed toward another end of the wall structure and extending in generally normal relation away from the wall structure or first leg portion, with the third leg or flange portion being spaced from but extending in the same direction as and in generally parallel, relation with the second leg or flange portion to minimize the section modulus of the gate assembly frame. In a most preferred form, the third leg or lower flange portion of the side frame and end frame members are arranged generally coplanar relative to each other.

Moreover, the spacing between the second and third leg or flange portions of the side frame members is such that the cam structure provided on the operating shaft assembly traverses a path of rotation which is confined within the spacing provided therebetween.

Please add Paragraphs [0024.1] through [0024.19] as follows:

[0024.1] In accordance with another aspect, there is provided a railroad hopper car discharge gate assembly including a rigid frame configured with a generally square and ledgeless discharge opening greater than 1600 square inches whereby allowing for rapid discharge of commodity therethrough. A gate having an upper surface defining an area generally equivalent to the size of the discharge opening is mounted on the frame for generally linear movements in a predetermined plane between a closed position, wherein the gate prevents flow of commodity through the discharge opening and, and an open position. The frame is configured to inhibit bending of the frame and the gate under columnar loading adapted to be applied to the greater than 1600 square inches of surface area defined by the gate and which is exposed to commodity

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carried by a railcar to which the gate assembly is adapted to be operably coupled. The gate assembly frame includes an upper flange extending outwardly and about a periphery of the frame for facilitating connection of the gate assembly to a hopper of a railroad car. The frame further includes wall structure rigidly connected to and depending from the upper flange. The predetermined plane of movement of the gate is disposed in vertically spaced relation below the upper flange on the gate assembly frame.

Seal structure is arranged in sealing engagement with an upper surface and toward a peripheral edge of the gate when the gate is in the closed position. The seal structure is carried by the frame in vertically spaced relation below the upper flange. Preferably, the seal structure is configured to promote movement of the commodity therepast when the gate is moved toward the open position.

[0024.3] To selectively move the gate between closed and open positions, an operating shaft assembly is supported on the frame for rotation about a fixed axis. Preferably, the operating shaft assembly is operably coupled to the gate through pinions mounted on a shaft rotatable about the fixed axis. The pinions of the operating shaft assembly are arranged in intermeshing relation with racks carried by the gate. Moreover, a lock assembly is mounted on the gate assembly frame and includes a stop for inhibiting inadvertent movement of the gate from the closed position toward the open position. In one form, the lock assembly stop is urged into releasable engagement with the gate.

[0024.4] Preferably, the railroad hopper car discharge gate assembly further includes a

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[0024.5]

plurality of laterally spaced support members. Such support members are carried by the frame and arranged in generally parallel relation relative to the direction in which the gate moves between the open and closed positions for limiting deflection of the gate.

According to yet another aspect, there is provided a railroad hopper car discharge

gate assembly including a frame having a pair of spaced, generally parallel side frame members and a pair of spaced, generally parallel end frame members fixed between the side frame members to define a ledgeless discharge outlet for the gate assembly. A gate, having upper and lower generally parallel surfaces, is adapted for sliding movements along a predetermined path of travel between closed and open positions relative to the discharge opening defined by the gate assembly. The side frame members and end frame members of the gate assembly frame each [0024.6] have wall structure with a first flange portion joined to and extending in generally normal relation away from an upper end of the wall structure. The spacing between the wall structures of the side frame members and end frame members is generally equal such that the ledgeless discharge outlet for the gate assembly has a generally square configuration and ranges in operative size between about 1400 and about 1760 square inches. Laterally spaced support members, carried by the frame, extend across the ledgeless discharge outlet. The support members extend generally parallel to the side frame members and between the end frame members and are arranged in sliding engagement with the lower surface of and support the gate in the closed position against columnar load adapted to be exerted against the upper surface of the gate. The predetermined path of travel of the gate is disposed in vertically spaced relation below the upper flange on the

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side frame and end frame members. Moreover, the side frame members, end frame members, and support members of the gate assembly are configured to withstand columnar loading adapted to be applied the upper surface of the gate, generally corresponding in cross-sectional size to the cross-sectional area of the generally square discharge opening. The side frame members extend away from the discharge outlet for the gate assembly and are configured to support the gate when the gate is moved to an open position.

[0024.7] Seal structure is arranged in sealing engagement with an upper surface and toward a peripheral edge of the gate when the gate is in the closed position. The seal structure is carried by the frame in vertically spaced relation below the flange on the side frame members and end frame members. The seal structure is configured to promote movement of the commodity therepast when the gate is moved toward the open position.

[0024.8] An operating shaft assembly is carried by the side frame members for rotational movement about a fixed axis. The operating shaft assembly is operably coupled to the gate through pinions mounted on an operating shaft rotatable about the fixed axis. In one form, the pinions intermesh with racks mounted on the lower surface of the gate. Preferably, the operating shaft extends transversely across the predetermined path of travel of the gate and includes capstans arranged at opposite ends thereof. The capstans are disposed for engagement from either side of the gate assembly.

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According to this aspect, a lock assembly is carried by the side frame members and [0024.9] includes a displacable stop for inhibiting inadvertent movement of the gate from the closed position toward the open position. In one form, the lock assembly further includes a mechanical system carried by the side frame members for positively displacing the stop in timed relation relative to operation of the operating shaft assembly. In a preferred embodiment, a lost motion mechanism is operably disposed between the operating shaft assembly and the mechanical system for the lock assembly for effecting sequential movement of the stop and the gate in predetermined relation relative to each other. Moreover, the mechanical system preferably includes cam structure disposed adjacent to the side frame members to minimize the effect high torque requirements, inputted to the operating shaft assembly, have on operation of the lock assembly. According to this aspect, each side frame member and each end frame member of [0024.10] the gate assembly frame further includes a second flange portion joined to and extending in generally normal relation away from a lower end of the wall structure. The second flange portion extends in the same direction as and in generally parallel relation with the first flange portion to add strength and rigidity to the frame. Preferably, a distance of about 9.0 inches is measurable between the first and second flange portions of each side frame member and each end frame member on the gate assembly frame. Moreover, the second flange portion on each of the side frame and end frame members are preferably arranged generally coplanar relative to each other. Preferably, the support members of the gate assembly include a first support [0024.11]member extending generally along a longitudinal centerline of the gate assembly, with second and

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third support members disposed to opposite lateral sides of the longitudinal centerline of the gate assembly. In a preferred embodiment, each support member is configured to enhance the ability of the gate to slide thereover as the gate moves between the closed and open positions.

[0024.12] According to this aspect, a tamper seal arrangement is arranged in combination with the operating shaft assembly for accepting a seal. As will be appreciated, providing such a seal yields a visual indication whether the gate has been moved toward the open position.

According to still another aspect of the invention, there is provided a gate [0024.13] assembly adapted to be secured in material receiving relation relative to a standard opening defined toward a bottom of a railroad hopper car. The gate assembly includes a rigid frame having a longitudinal axis and including a series of rigidly interconnected side frame members and end frame members which are spaced relative to each other and configured to provide the frame with a ledgeless and generally square discharge opening sized substantially equivalent to the standard opening defined toward the bottom of the railroad hopper car so as to allow commodity, discharged from the opening in the bottom of the railcar, to pass through the gate assembly in a substantially unhindered fashion thereby promoting the discharge of commodity from the railcar. The side frame members and end frame members define a bolting pattern generally corresponding to a standard bolting pattern surrounding the standard opening toward the bottom of the railroad hopper car whereby facilitating securement of the gate assembly to the railroad hopper car. Each side frame member and each end frame member include a peripheral flange portion joined to and extending outward from an upper end of depending wall structure. A generally centralized

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support, carried by the frame, extends generally parallel to the longitudinal axis of the frame with two additional supports disposed to opposed sides of the centralized support.

[0024.14] A gate is slidably mounted on the frame for endwise movements between open and closed positions relative to the ledgeless opening defined by the frame. The gate slides along a generally linear path of movement for controlling discharge of commodity through the ledgeless opening. The gate is supported by the supports when in the closed position and is supported by the frame when moved to the open position. Preferably, each support on the frame is provided with material for enhancing the ability of the gate to slide thereover as the gate moves between the closed and open positions. The linear path of movement of the gate is disposed vertically beneath the flange portion on each side frame member and each end frame member of the rigid gate assembly frame.

[0024.15] Seal structure is arranged in sealing engagement with an upper surface and toward a peripheral edge of the gate when the gate is in the closed position. The seal structure is carried by the frame in vertically spaced relation below the flange on the side frame members and end frame members. The seal structure is configured to promote movement of the commodity discharged from the hopper car therepast when the gate is moved toward the open position.

[0024.16] An operating shaft assembly is mounted on frame extensions of the side frame members for rotation about a fixed axis. The operating shaft assembly defines a pair of opposed ends disposed for operator access from opposite sides of the gate assembly frame. Preferably, the operating shaft assembly includes an elongated shaft supported for rotation by a pair of operating

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handles secured at opposite ends of the shaft and rotatably mounted on the frame extensions of the gate assembly.

Preferably, the gate assembly frame further includes structure for limiting [0024.17] deflection of the shaft of the operating shaft assembly when the operating shaft assembly is rotated to move the gate from the closed toward the open position. Moreover, each side frame member and each end frame member furthermore preferably includes another peripheral flange portion joined to and extending outwardly from a lower end of the depending wall structure such that each end frame member and each side frame member is configured to maximize the section modulus of the frame. In one form, the flange portion extending outwardly from the upper end of the wall structure of each end frame member and each side frame member defines a series of apertures defining the bolting pattern for the gate assembly. In a preferred form, the flange portions extending outwardly from the lower end of the wall structure on the side frame and end frame members of the gate assembly frame are arranged generally coplanar relative to each other. [0024.18] According to this aspect, a drive mechanism operably couples the operating shaft assembly to the gate. Preferably, the drive mechanism includes a pair of laterally spaced pinions mounted on a shaft of the operating shaft assembly. The pinions are arranged in intermeshing relation with racks carried by the gate. As such, and upon rotation of the operating shaft assembly, the gate linearly moves between the open and closed positions, depending upon the rotational direction the operating shaft assembly is turned. Moreover, a lock assembly is mounted on the frame extensions and includes a stop mounted for movement between a first position,

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wherein the stop is disposed in the path of movement of the gate whereby inhibiting inadvertent movement of the gate from the closed position toward the open position, and a second position, wherein the stop permits movement of the gate toward the open position

[0024.19] According to this aspect, a tamper seal arrangement is arranged in combination with the operating shaft assembly for accepting a seal. As will be appreciated, providing such a seal yields a visual indication whether the gate has been moved toward the open position.

Please amend Paragraph [0049] as follows:

[0049] Turning to FIGS. 3 and 4, each gate assembly 30 includes a rigid frame 32 having a longitudinal axis 33. The gate assembly frame 32 is formed of a pair of generally parallel side frame members 34, 35 and a pair of generally parallel end frame members 36, 37 fixed between the side frame members 34, 35. The side frame members 34, 35 and end frame members 36, 37, in combination, define a generally rectangular square and ledgeless discharge opening 40 therebetween.

Please amend Paragraph [0051] as follows:

[0051] As shown in FIG. 2, side frame member 34 includes a first, generally planar leg portion or wall structure 42 and a second leg portion 44 disposed toward one end of and extending in generally normal relation relative to and away from the wall structure or first leg portion 42. The second leg or flange portion 44 defines a series of side-by-side openings or holes

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46. To add further rigidity and stiffness thereto, the side frame member 34 further includes a third leg or flange portion 48 disposed toward an opposite end of and extending in generally normal relation and away from the <u>wall structure or</u> first leg portion 42. As shown, the third leg or flange portion 48 is spaced from but extends in the same direction and in generally parallel relation with the second leg or flange portion 44. Preferably, the first, second and third leg portions 42, 44 and 48, respectively, are integrally formed with each other. In a preferred form, the first and third leg or flange portions of side frame member 34 are spaced apart by a distance of about 9.0 inches.

Please amend Paragraph [0052] as follows:

[0052] As shown in FIG. 5, end frame member 36 includes a first, generally planar leg portion or wall structure 52 and a second leg or flange portion 54 disposed toward one end of and extending in generally normal relation relative to and away from the wall structure or first leg portion 52. As shown, the second leg or flange portion 54 defines a series of side-by-side openings or holes 56. Suffice it to say, the holes or openings 46 in the side frame members 34, 35 combine with the holes or openings 56 in the end frame members 36, 37 to define a standard bolting pattern which corresponds to the standard bolting pattern on the mounting flange 20 of the hopper 12. In the illustrated embodiment, suitable fasteners 59 pass through the openings 22 in the hopper mounting flange 20 and through the openings 46, 56 in the gate assembly frame 32 to secure the gate assembly 30 to hopper 12.

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Please amend Paragraph [0053] as follows:

[0053] To add further rigidity and stiffness thereto, the end frame member 36 further includes a third leg or flange portion 58 disposed toward an opposite end of and extending in generally normal relation away from the wall structure or first leg portion 52. As shown, the third leg or flange portion 58 is spaced from but extends in the same direction and in generally parallel relation with the second leg or flange portion 54. Preferably, the first, second and third leg portions 52, 54 and 58 of the end frame member 36 are integrally formed with each other. In the preferred embodiment, the third leg or flange portion 48 of the side frame members 34, 35 are arranged in generally coplanar relationship with the third leg or flange portion 58 of the end frame members 36, 37 whereby facilitating attachment of a conventional unloading boot or the like to the gate assembly 30.

Please amend Paragraph [0054] as follows:

[0054] According to the present invention, the lateral spacing disposed between an inner surface of the generally planar <u>wall structures or</u> first leg portions 42 of the side frame members 34 and 35 preferably ranges between about 37.5 inches to about 44 inches. In a most preferred embodiment, the lateral spacing disposed between an inner surface of the generally planar <u>wall structures or</u> first leg portions 42 of the side frame members 34 and 36 measures about 43.5 inches. The longitudinal spacing disposed between an inner surface of the generally planar <u>wall structures or</u> first leg portions 52 of the end frame members 35 and 37 preferably ranges between

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about 37.5 inches to about 46 inches. In a most preferred embodiment, the longitudinal spacing disposed between an inner surface of the generally planar <u>wall structures or</u> first leg portions 52 of the end frame members 36 and 37 measures about 45.5 inches <u>so as to provide the discharge</u> opening 40 with a generally square configuration.

Please amend Paragraph [0055] as follows:

[0055] A gate 60 of a size generally corresponding to that of the ledgeless discharge opening 40 is mounted for sliding movements between closed and open positions along a linear predetermined path of movement for controlling the discharge of commodity from hopper 12 (FIG. 1). As shown in FIGS. 2 and 3, the predetermined path of movement or travel of gate 60 is disposed in vertically spaced relation below the upper flange portions 44 and 54 on the side frame members 34, 35 and end frame members 36, 37, respectively, of the gate assembly frame structure 32. As shown in FIG. 6, gate 60 has a planar configuration and includes a first or upper surface 62 and a second or lower surface 64 extending generally parallel relative to each other.

Please amend Paragraph [0059] as follows:

[0059] As shown in FIGS. 2 and 5, seal structure 90 is preferably carried on the gate assembly frame 32 for inhibiting debris and insect infiltration between the frame 32 and the gate 60. In the illustrated embodiment, seal structure 90 is arranged relative to in sealing engagement with the upper surface 62 and toward a periphery of the gate 60 when gate 60 is in the closed

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position. In the exemplary embodiment, and as shown in FIGS. 2 and 3, seal structure 90 includes a hollow mounting 92 secured to the side frame members and end frame members 34, 35 and 36, 37, respectively, of the gate assembly frame 32 in vertically spaced relation below the upper flange portions 44 and 54 of the side frame members and end frame members 34, 35 and 36, 37, respectively. The hollow mounting 92 is specifically configured to allow commodity discharged from the hopper 12 of railcar 10 to readily pass thereover. Moreover, structure 90 includes a conventional carpet seal 94, or other suitable seal, accommodated preferably within the mounting 92, and configured to sealingly engage about the periphery of the upper surface 62 of and after gate 60 moved to a closed position.

Please amend Paragraph [0064] as follows:

[0064] Movement of the gate 60 from a closed position toward an open position along its fixed path of movement is influenced by a lock assembly 120. The purpose of the lock assembly 120 is to releasably hold the gate 60 against movement toward an open position until the lock assembly 120 is purposefully released by the operator. With the present one form of the invention, and in compliance with AAR Standards, lock assembly 120 is configured such that it is initially released in response to operation of the operating shaft assembly automatically followed by movement of the gate 60 toward an open position. That is, the unlatching of the lock assembly 120 and opening of the gate 60 are affected in sequential order relative to each other and in response to rotation of the operating shaft assembly 100.

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Please amend Paragraph [0065] as follows:

[0065] Turning to In the exemplary embodiment illustrated in FIG. 7, lock assembly 120 is preferably designed as a subassembly which is fabricated independent of the frame 32 and subsequently added thereto. As shown, lock assembly 120 includes a stop 122 mounted for movement between a first position, wherein stop 122 is disposed in the path of movement of the gate 60 to inhibit inadvertent movement of the gate 60 from the closed position toward the open position, and a second position, wherein stop 122 is removed from the path of movement of the gate 60. Lock assembly 120 further furthermore preferably includes a mechanical system 124 for moving the stop 122 between the first and second positions in timed sequential movement relative to movement of the gate 60 toward the open position

Please amend Paragraph [0078] as follows:

[0078] As will be appreciated According to one aspect, timed unlatching or removal of the lock assembly stop 122 from the path of movement of the gate 60 is critical to proper performance of gate assembly 30. Of course, and since the AAR Standards require unlatching of the gate 60 to relate to operation shaft assembly 100, inadvertent skipping movements of the pinions 116 relative to the racks 114 will can destroy such timed relationship. It is not unusual, however, for the pinions 116 to skip relative to the racks 114, thus, hindering timing of operation between the gate 60 and lock mechanism 120 when an unusual high level of torque is inputted to the shaft assembly 100. Such high levels of torque typically result during the initial openings stages for gate 60.

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Such high levels of torque tend to cause the shaft 104 of assembly 100 to deflect relative to its rotational axis 102 thereby resulting in displacement of the pinions 116 relative to the racks 114, thus, destroying timed movement of the gate 60 with operation of the operating shaft assembly 100.

Please amend Paragraph [0081] as follows:

[0081] Operation In one form, operation of the gate 60 and lock assembly 120 is such that when gate 60 is in a closed position, each stop 122, 122' of assembly 120 (FIG. 7) is in positive engagement with gate 60 and shaft 104 of assembly 100 is disposed relative to the slip pinions 116 substantially as shown in FIG. 12. The gate 60 is locked in its closed position at this time. With the gate 60 closed, as shown in FIG. 12, the outer surface of shaft 104 extends generally parallel to and likely engages the walls or surfaces 172 of each slip socket or recess 166 of each slip pinion 116.

Please amend Paragraph [0092] as follows:

[0092] The gate assembly 30 is furthermore configured with a frame 32 capable of withstanding significantly increased net columnar loading, as compared to conventional gate assemblies, coupled with advantageously offering a reduced cumulative distance between an upper surface of the second leg portion 44 on the gate assembly frame 32 and the lowermost surface on the third leg portion 46 of the gate assembly frame 32 compared to conventional gate

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assemblies. Accordingly, and after securing it to the hopper car 10, the gate assembly 30 of the present invention offers increased clearance beneath a lowermost surface thereof. Offering such an advantage has been recognized through the elimination of the transition wall section normally associated with railroad hopper-type gate assemblies and a unique gate assembly design offering a discharge opening 40 generally corresponding to the standard opening 18 on the hopper car 10. Although configured to withstand the significantly increased net columnar loading, as compared to conventional gate assemblies, the frame members 34, 35 and 36, 37 of the gate assembly frame 32 are advantageously designed such that the path traversed by the peripheral edge of the cam structure 42 is embraced within limits defined by the second and third leg or flange portions 44, 48 and 54, 58 thereof whereby promoting attachment of a conventional discharge boot to the underside of the gate assembly frame 32. In a preferred form, the leg or flange portions 44, 48 and 54, 58 of frame members 34, 35 and 36, 37, respectively, are separated by a distance of about 9.0 inches.